National Aeronautics and Space Administration

technology opportunity

Portable Wireless Signal Booster

Increases signal strength for commercial wireless products

Innovators at NASA Johnson Space Center have invented a portable communications signal booster that is currently available for licensing. Originally designed to improve communications for lunar missions, this lightweight, portable device can boost incoming signals to improve local reception for cell phones, laptops, satellite and Wi-Fi internet receivers without the need for power plugs, cables or batteries. This portable signal booster can be configured as an umbrella or window shade for easy deployment and compact storage. This technology has the flexibility to be designed in different shapes and sizes to offer variations in booster strength and degree of directional focus.

Benefits

Features:

- High performance: 7-15 dB gain increase
- Cable-free: Requires no physical connection to wireless devices
- No power plugs nor batteries required
- Compact, portable and lightweight
- Easy to set up, easy to store
- Simple, low-cost manufacturing

Potential Uses:

- Boost “dead zones” at home and work
- Provide wireless communications systems for field, emergency and rescue workers
- Enhance hunting, camping and other remote/outside experiences
- Support RFID/wireless sensor networks

Applications

- Military
- Remote Industrial
- Logistics
- Home and Work
- Outdoor Activities
- Field Work
- Travel
- Auto

Commercial Opportunity

- ☒ Patent Pending
- ☒ U.S. Patent(s)
- ☐ Copyrighted
- ☒ Available to License
- ☐ Available for No-Cost Transfer
- ☐ Seeking Industry Partner for Co-Development

MSC- 24525

Technology Details

Why it was developed

Communications are of paramount importance in conducting space missions, and an antenna's signal strength is vital to the success of any mission. All antennas have a limited range. NASA needed a mobile signal booster that could be placed as needed to supplement any weak spots encountered by an astronaut crew at the site once a baseline system was deployed. Like all space hardware, the booster needed to be durable, compact and lightweight.

How it Works

This innovation successfully integrates the classic "Fresnel Ring" model into a conductive fabric structure. The result is an ultra-light, deployable device that acts as a lens to significantly enhance the realizable gain of an antenna.

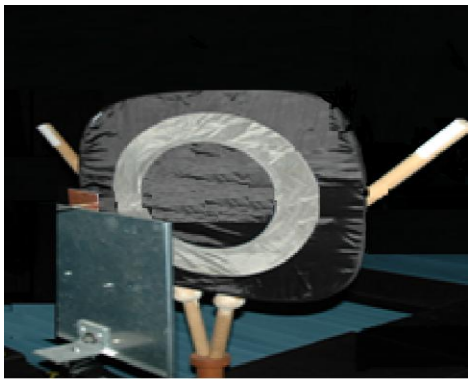

Figure 2: Prototype of a Portable Signal Booster designed to deploy and fold/store in a similar manner as a car sun shade.

Prototype

Figure 2 illustrates a prototype of the portable signal booster in a ring configuration that was tested in the Anechoic Chamber at NASA-JSC. The "sun shade" part of this prototype is 220 sq. in. when deployed and is about 31 sq. in. when folded for storage.

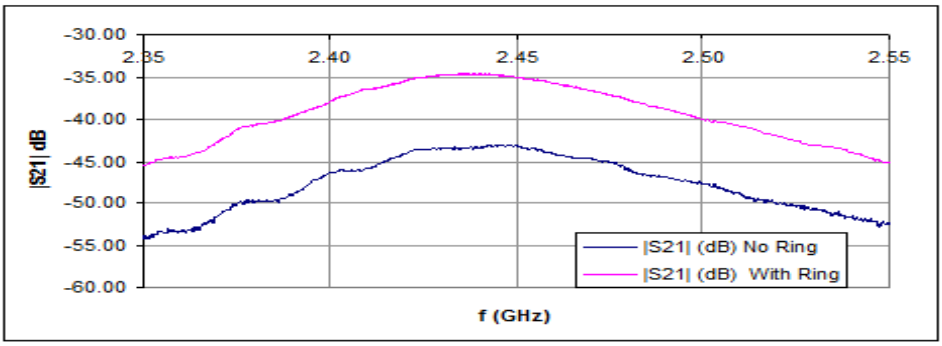

Figure 1: Results of the gains with no signal booster ring (in blue) and with signal booster ring (red)

A Fresnel Ring design on the booster is specially shaped to cancel specific phases of the radiated signal. This makes other more desirable parts of the signal more prominent.

Different variations of shapes of the booster can be offered. A round, medium-size unit could expect to increase signal gain in all directions by about 7 dB. A larger, elliptical-shaped unit could expect to increase signal gain in a focused direction by up to 15 dB.

Patents

This Technology has a patent pending under application SN: 12/894749 Deployable Fresnel Rings. It is related to a patented technology, patent # 7,126,553, titled Deployable Antenna.

Licensing and Partnering Opportunities

This technology is part of NASA's Innovative Partnerships Office (IPO), which seeks to transfer technology into and out of NASA to benefit the space program and U.S. industry.

NASA invites companies to consider licensing (MSC-24525) Deployable Fresnel Rings for commercial applications.

For More Information

If you would like more information or want to pursue transfer of this technology please contact us at:

Technology Transfer Office
NASA Johnson Space Center
Phone: 281-483-3809
Email: jsc-techtran@mail.nasa.gov